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A systematic literature review of creativity thinking in primary school: a systematic review of research trends and frameworks

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ABSTRACT

Creative thinking is a skill that students must have in the 21st Century. This study aims to identify research trends on creative thinking in primary schools, the types of qualitative research used, countries that frequently publish on creative thinking, journals with the highest SJRs publishing creative thinking, researchers who frequently research creative thinking in primary schools, what elements are frequently implemented in creative thinking in primary schools and creative thinking frameworks from 2013-2024. The review procedure included searching, screening, evaluating and synthesizing publications on creative thinking in primary schools. There were 50 articles published in Scopus indexed popular journals. The analysis reveals prominent journals such as Thinking Skills and Creativity and British Journal of Education Technology, and identifies key researchers contributing to the field. The study highlights the frequent use of qualitative methods such as descriptive qualitative, case studies, phenomenology, grounded theory, and ethnography, across various countries including Slovenia, Malaysia, and the UK. What types of qualitative methods are used in applying creative thinking skills in elementary schools, namely descriptive qualitative, case studies, phenomenology, grounded theory, and ethnography.

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Introduction

In the rapidly evolving global landscape of the 21st century, creative thinking skills have emerged as essential competencies for navigating the complexities of modern life and the workforce. The National Academy of Sciences reports that future career choices require human resources skilled in problem solving, quantitative reasoning and modeling, communication, and creative thinking (Science Education, 2012). However, data from the Central Bureau of Statistics shows that Indonesia's workforce is still highly dominated by unskilled workers. (Central Bureau of Statistics of the Republic of Indonesia,

2021). In addition, most people (30%) work as production workers, transportation equipment operators, and manual laborers. Only around 7% of Indonesians work as professionals, technicians, and the like (Central Bureau of Statistics of the Republic of Indonesia, 2022). This data can assume that most of Indonesia's workforce is still low. Individuals who have the skills to identify, integrate, and implement in solving real-world problems are still not optimal.

There have been many studies that state, to face the demands of the 21st century, diverse knowledge and thinking skills are needed (Fakaruddin, Shahali, & Saat, 2024). Skills that need to be mastered by learners in the 21st century include; critical thinking, problem solving, creativity, innovation, creative thinking and communication (Gregoriou, 2019). According to (Hadar & Tirosh, 2019) an idea in a creative thought will appear when someone has a problem in his life, then the person tries to solve the problem, D. Fasco said "Creativity is associated with the ability to handle high task novelty" which means that the more often a person faces a problem of a different level, there will be an urge in him to think creatively in finding solutions or creative ideas from the problems faced. Through continuous encouragement, students will become accustomed to always thinking and reflecting. Of course, in the learning process, creative thinking should always be instilled in every student, where they will explore the knowledge within their own minds to try and discover something new.

Creative thinking is a process that involves elements of originality, fluency, flexibility, and elaboration (Juriševič & žerak, 2024). This shows that creative thinking can develop thinking power (Schoevers et al., 2019; Schoevers et al., 2019). Indicators of creative thinking skills include fluency, flexibility, and clarity (elaboration). The steps in the Guided Inquiry learning model can increase students' learning creativity (Schut, van Mechel, 2019). (Schut, van Mechelen, Klapwijk, Gielen, & de Vries, 2022). The steps in its implementation are orientation, formulating problems, formulating hypotheses, collecting data, testing hypotheses, and conclusions. One of the indicators is fluency which can be measured by the number of relevant answers/opinions in the number of responses that can be generated from a question. The fluency assessed in this study is based on students' ability to produce many correct answers and express ideas quickly in solving problems. In accordance with Guilford's opinion, clarity (elaboration) is the ability to detail an idea or idea to a given stimulus. To see flexibility, we can analyze how students see problems from different perspectives.

Although many previous studies have shown the positive impact of applying creative thinking in learning, and although these studies have been published in separate and complex ways, more research is needed on the key elements that can optimize the application of creative thinking. This systematic literature review (SLR) aims to identify key journals that address this topic, the most active and influential researchers, commonly used research methods in creative thinking skills, the key elements of creative thinking learning, the most frequently applied methods, as well as the frameworks used for creative thinking skills and simulation. Furthermore, some research questions were formulated: a) which journals most frequently discuss creative thinking skills from the SJR level? b) who are the researchers active in creative thinking skills research in primary schools? c) what types of qualitative methods are used in the implementation of creative thinking skills in primary schools? d) which countries publish qualitative research? e) what are the implementations of creative thinking skills in primary schools, and what recommendations can be made for further research?

Method

A research trend is the collective behavior of a group of researchers who begin to take an interest in a particular scientific topic (Prahani, Rizki, Suprapto, Irwanto, & Kurtuluş, 2024). It is generally viewed as a condition in which the interests and needs of society correspond to contemporary scientific findings. (Chen, 2024). A systematic literature review plays an important role in building theoretical foundations, identifying research gaps, strengthening methodologies, supporting arguments, and avoiding duplication of previous research (E. Murniarti, B. Nainggolan, H. Panjaitan, L. E. A. Pandiangan, I. D. A. Widyani, 2018). This is known as a structured literature review that promises to examine previous research (S. Kraus, M. Breier, 2022). It is conducted as an SLR by following the original guidelines proposed by (M. K. Linnenluecke, M. Marrone, 2020). Comprehensively, this literature

review was used to search for data, such as selecting reliable database sources, identifying search strings, specifying inclusion or exclusion criteria, specifying quality criteria (S. B. Wanyama, R. W. McQuaid, 2022). This research uses a Systematic Literature Review (SLR) approach to identify and synthesize literature related to creative thinking skills in elementary schools from 2013 to 2024. The research population consists of journal articles indexed in Scopus that meet the inclusion criteria, such as qualitative research type and topic relevance. Article samples were selected through a three-stage process: screening titles, abstracts, and full texts. The analysis process was conducted using a thematic approach to identify research trends, theories, and methods used. The literature review aims to detect common themes, theoretical perspectives, and issues and to identify components of theoretical concepts. (H. Snyder, 2019) of recent studies. It will contribute to the research by synthesizing existing research to create a further research agenda. It is defined as the process of identifying, assessing, synthesizing, and interpreting research in a more effective way (M.J.et al, 2021). As a literature review, this research relies on secondary sources, such as reputable and high-quality journal articles.

Database Source

The importance of the database lies in its role as the primary repository of publication metadata and bibliometric metrics. Ensuring the selection of the right data repository is crucial in assessing the credibility of a study. It is essential for SLRs to use more than one database (T. M. det al, 2020). In accordance with the existing literature, Scopus emerges as the two main bibliographic databases used (Pranckutė, 2021). These databases are widely favored in systematic review endeavors due to their global recognition, comprehensive coverage, and competitive citation indexing (J. Zhu and W. Liu, 2020). (K. Li, J. Rollins, 2018) described Clarivate Analytics' WoS as "the world's leading scientific citation search platform, instrument, and analytical information across knowledge. As a result, the primary data source for this study was Scopus.

Preferred reporting items for systematic reviews and meta-analyses

The systematic review and meta-analysis process in this study followed the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) guidelines. PRISMA was first introduced in 2009, but has now been superseded by the PRISMA 2020 version, which includes updates to the reporting criteria to match recent developments in the process of identifying, selecting, scoring and summarizing studies (M. J. P. et al, 2021). The PRISMA diagram illustrates the data collection and screening procedures of a systematic review. First, all indexed studies were exported to an Excel file. Next, title screening (first screening), abstract screening (second screening), and full text screening (third screening). The eligibility of each potentially eligible study is critically assessed, and any discrepancies are resolved through discussions with senior researchers, until consensus is reached. PRISMA serves as an important guide for researchers in improving the clarity and quality of communication of the results of literature reviews and meta-analyses. There are 27 assessment criteria in PRISMA specifically designed for randomized trial studies (M. J. Page et al., 2021).

Identification and screening

The first step in the identification process is to find words or phrases that have the same meaning (synonyms) as well as related terms, including various word variations. At this stage, researchers reproduce keywords that are considered important. The more keywords used, the more likely the database is to find publications relevant to those keywords. Before choosing the right keywords, it is important to determine some basic concepts first. There are four main sources for keyword development: keywords from previous articles, databases, web resources that provide synonyms, and keyword ideas from professionals (H. H. M. Shaffril, S. F. Samsuddin, 2021). The keywords used in this search are: "Creativity Thinking to Primary School". The use of keyword strings can make the search process more effective and efficient. The search was conducted by considering the needs of each database, including titles, abstracts, and keywords, with a time range from 2013 to 2024. The articles searched were limited to those indexed in Scopus. From the advanced search, 551 articles were found in Scopus. After collecting the articles, we classified each study as quantitative (empirical), qualitative, conceptual, or literature review.

Extraction, synthesis, and feasibility

Our article selection process is gradual. First, we made sure all the articles we selected were unique and not the same. Then, we filtered the articles based on the criteria we had set (listed in Table 1). After

that, we read all 551 articles. However, only 69 articles were suitable for our topic, Creativity Thinking for Primary School. From these 69 articles, we selected the 50 most relevant and qualified articles to be used in our research. Systematic review methodology adapted from (B.K. Prahani, 2024; H. H. M. Shaffril, S. F. Samsuddin, 2021) was used as a reference to conduct a thorough synthesis of the academic literature related to Creativity Thinking to Primary School

Table 1. Inclusion and exclusion criteria

Criteria	Inclusion	Exceptions
Study type	Qualitative research	Review paper
Time	2013-2024	Conceptual paper
Language	English	Other languages
Document type	Final journal article and conference paper	Books, book chapters, proceedings, reports, and short surveys
Study topic	Related to Creativity Thinking in Primary School	In addition to Creativity Thinking in Primary School

Data abstraction and analysis

The remaining papers were then assessed and analyzed in depth, focusing on research that aligned with the review objectives. After reading the abstracts, data was initially extracted, and then the full articles were reviewed in detail to identify relevant themes. Figure 1 provides a comprehensive summary of the relevant academic literature. As shown in Figure 1, the evaluation included careful identification, screening, eligibility and selection stages (M. J. Page et al., 2021).

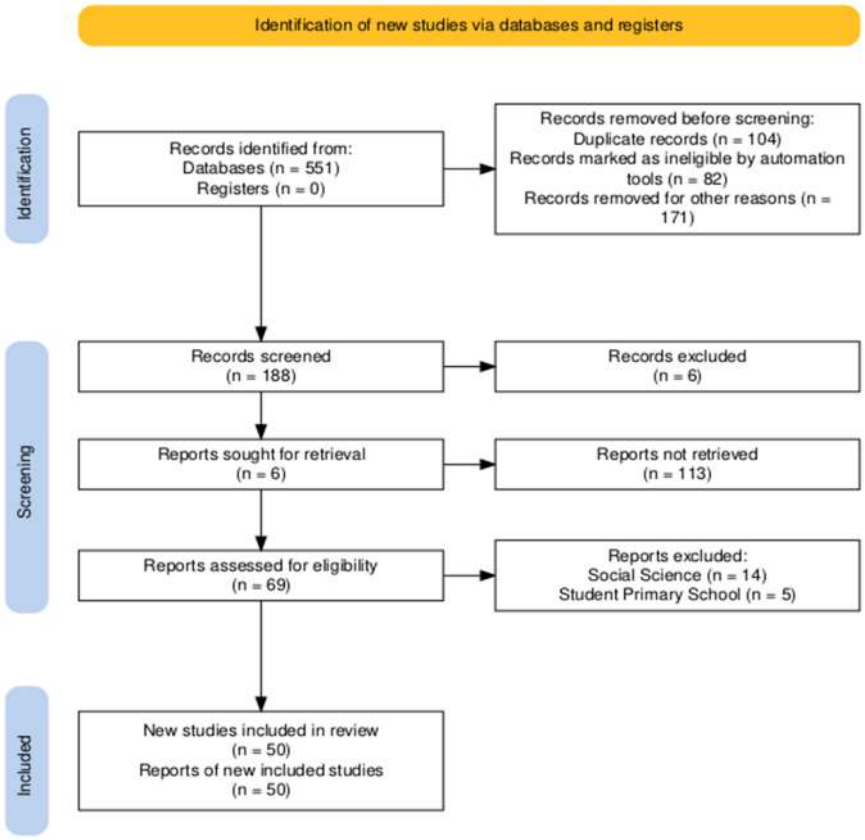

Figure 1 Identification, Screening, Eligibility and Selection: Creative Thinking in Primary School

Results and Discussions

The results of this study point to several important findings. First, we found that a lot of research has been done on this topic. These studies are very useful for understanding and developing learning. We also identified the most influential researchers and frequently used research methods. In addition, we

found the key elements that make creative learning successful. Based on these findings, we propose new methods to enhance creative thinking. We also created a framework for enhancing creative thinking skills and combining creative thinking with simulation.

Significant publications

In this literature review, there were 50 primary articles that analyzed creative thinking skills in education. The key articles were published from 2013 to 2024. By analyzing the articles published in this period, this literature review can reflect the current trends, research methods, important elements or skills, and frameworks used by researchers before implementing creative thinking skills. Moreover, it can track recent changes and identify the approaches, theories, or concepts used. The articles analyzed were also limited to reputable and Scopus-indexed journal databases. In this case, conference proceedings were included in the literature review.

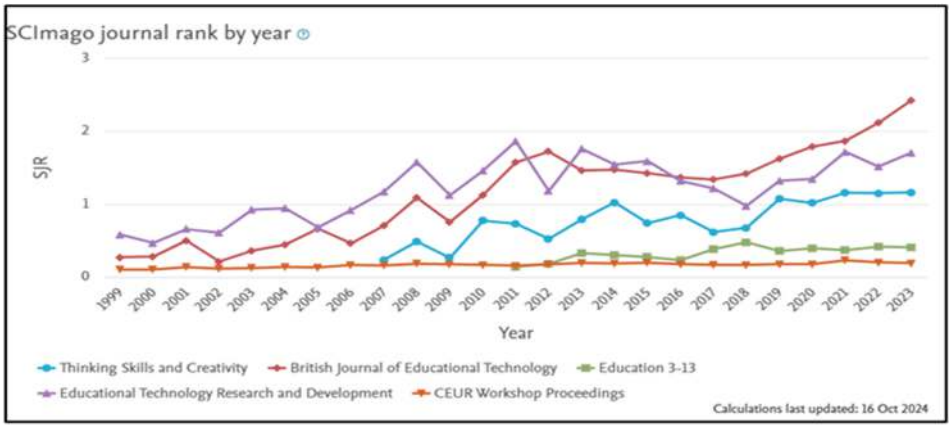

Figure 2 Journal Publications on the SJR Rankings

In addition, Figure 2 shows the Scimago journal rankings (SJR) and Q category journal grades (Q1-Q3). This also includes journals that study and implement creative thinking. Journal publications sorted by SJR value are Thinking Skills and Creativity, British Journal of Education Technology, Education 3-13, Education Technology Research and Development, and CEUR Workshop Proccedings.

Most active and influential researcher

Based on the selected main articles, the researchers have contributed to implementing creative thinking skills in primary schools. Figure 3 shows the researchers who are active in implementing creative thinking skills. Researchers listed according to the literature review were included in the main study. In particular, Hwang, G.J., Kroesbergen, E.H., Chen, Y.T, Gielen, M., Schut, A., Yang, G., Aytekin, A., Abdulah, N., Aguilar, N., Al Mahmud, A. are active researchers in creative thinking skills in primary schools.

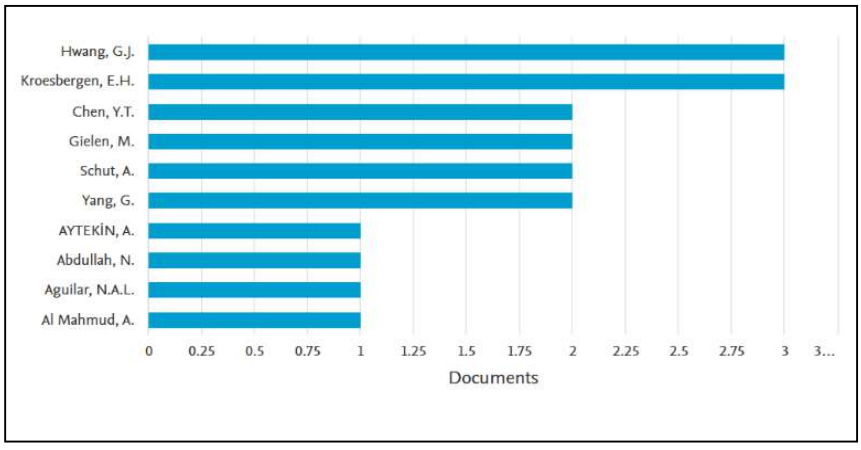

Figure 3. Researchers Listed According to the Literature Review Included in the Main Study

Based on figure 2, we can see that Hwang, G.J. and Kroesbergen, E.H. have contributed the most publications, followed by other researchers such as Chen, Y.T. and Gielen, M. This visual representation

helps highlight the most productive contributors in research on creative thinking in elementary schools.

The type of qualitative research method used in creative thinking skills

Based on the data, there are 50 articles, 14 of which are qualitative research articles. Although the research methods used in education vary, there are four research methods used in implementing creative thinking skills, as shown in Figure 4. The figure shows which countries publish with qualitative methods. These countries are Slovenia, Malaysia, UK, Spain, Netherland, Norway, South Africa, Indonesia, Poland, Israel, Australia and Cyprus.

The types of qualitative methods that are often carried out are descriptive qualitative, case studies, phenomenology, grounded theory, and ethnography. In Figure 5. explains the number of types of qualitative methods published. The explanation is as follows

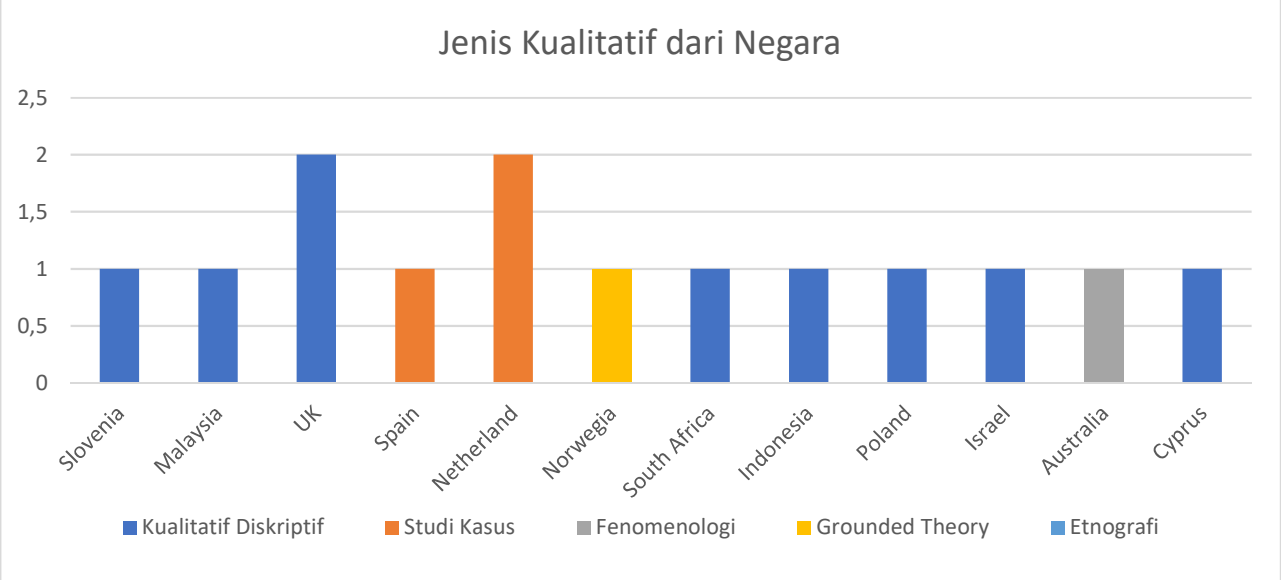

Figure 4 Countries that Publish Qualitative Research Types

Based on the data, there are 50 articles, 14 of which are qualitative research. Figure 4 displays the qualitative methods used in creative thinking research across various countries. The most common methods are descriptive qualitative, case studies, phenomenology, grounded theory, and ethnography. Countries such as Slovenia, Malaysia, the UK, and Spain show significant use of these methods, with the UK particularly emphasizing case studies.

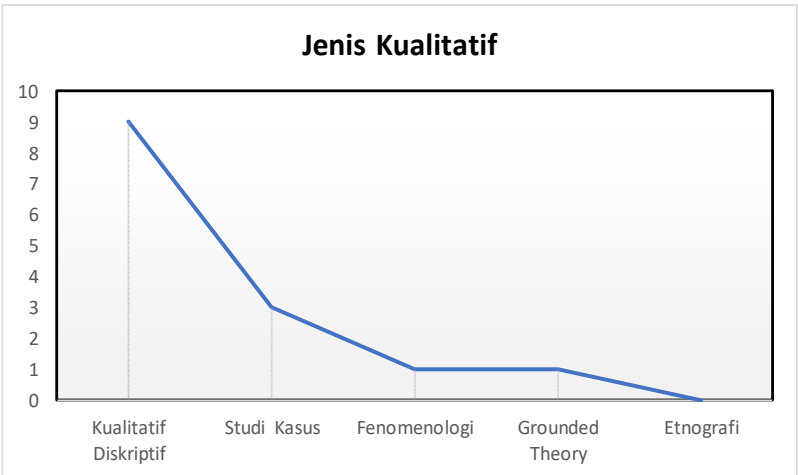

Figure 5. Most published qualitative research types

Based on Figure 5, which displays a line graph showing the distribution of various types of qualitative research methods used in creative thinking studies,,Descriptive qualitative research is the

most commonly used method, followed by case studies., Phenomenology, grounded theory, and ethnography are used less frequently., This graph highlights the dominance of descriptive qualitative research in the analyzed studies, with a sharp decline in the use of other methods.

Implementation of creative thinking skills in primary school learning

From a process perspective, creative thinking involves generating new ideas in a broad and diverse manner (Li, Chu, & Tang, 2024). It is a thinking process that generates, evaluates, and refines thoughts (PISA, 2015). It is a thinking process that generates, evaluates, and refines thinking (PISA, 2015), which includes synthesis, articulation, and imagination (Rhodes, 1961). From a comprehensive point of view, creative thinking skills involve four dimensions, namely fluency, flexibility, novelty, and elaboration. Divergent and convergent thinking are important components in creative thinking. Divergent thinking involves the generation of diverse, novel solutions, which is facilitated by cognitive lexibility and associative abilities In contrast, convergent thinking aims to find one single solution, which is supported by higher-order problem solving skills integral to luid intelligence.

According to The Torrance Tests of Creative Thinking (TTCT), the creative thinking ability instrument consists of four dimensions, namely flexibility, fluency originality, and elaboration. 1) *Fluency*; Measures the ability to generate a large number of different ideas or responses to a given stimulus, the indicator is producing a variety of similar ideas and answers to solve a problem. 2) *Originality*; Assessing the level of originality and novelty in ideas or responses, the indicators produce unique answers and different answers. 3) *Flexibility*; Evaluates the ability to switch between different types of ideas or responses, indicators of which Provide a variety of different descriptions and interpretations of an image, story, or problem. 4) *Elaboration;* Assesses the ability to expand and develop ideas, as well as the presence of details and associations, indicators produce ideas or details of steps on an object or idea. The implementation of creative thinking in learning in elementary schools, namely social science 53.9%, computer science 10.8%, psychology 7.8%, arts and humanities 5.9%, engineering 3.9%, business 2.0%, enviromental 2.0%, mathematic 2.0%, medical 2.0%, multidiciplinary 2.0%, other 7.8%. Implementation of creative thinking in elementary school learning.

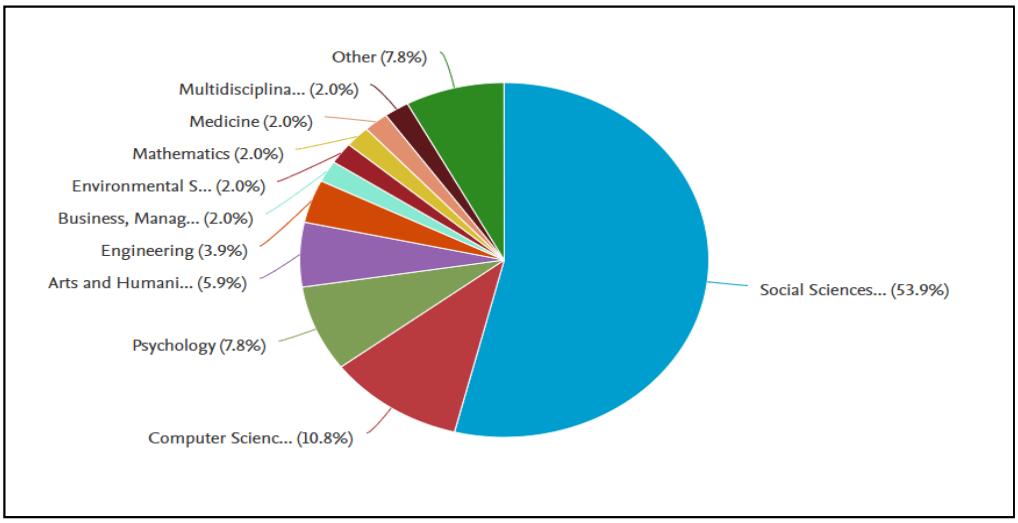

Figure 6 Implementation of Creative Thinking Skills

Frameworks often used in creative thinking skills

Wallas Theory

The theory presented by Wallas is a guide to the stages of creative thinking used in the research. Wallas' theory divides the creative thinking process into four stages, namely *preparation*, *incubation*, *illumination*, and *verification* (Selkrig, 2018). These stages are explained as follows (1) in the preparation stage students collect relevant information to solve the problem, (2) in the incubation stage students will temporarily detach themselves from the problem and think about it under the subconscious, (3) in the illumination stage students get ideas or ideas that arise in the incubation stage, and (4) in the verification stage students test the stage or check the answer results (Skjelstad Fredagsvik, 2022).

Wallas' creative thinking stages are used to measure creative thinking skills and to find out at what stage it is difficult for students to do. Basically, students are not accustomed to doing the stages of creative thinking thoroughly. Students are used to thinking instantly and relying on the help of others. Creative thinking skills can be improved if students are accustomed to doing each stage of creative thinking.

Figure 7 Wallas Framework

Rawlinson Theory

Creative thinking, there are stages that are passed, starting from preparation until the results of thinking are obtained. According to Rawlinson, creative thinking goes through the following stages (Stavrou, 2013a). Preparation stage; The stage to obtain facts about the problem to be solved (collection of information or data). b. Effort stage; The stage where individuals apply divergent thinking. At this stage, a conscious effort is needed to separate the production of ideas from the evaluation of ideas by postponing the assessment of the ideas that arise. c. Incubation stage; The stage where the individual seems to leave (disengage) from the problem and put it into the subconscious (incubate it), while his consciousness thinks about other things. d. Understanding stage; The stage of obtaining insight or understanding. Understanding stage; The stage of obtaining insight or what is commonly called aha erlibnis. The distinctive feature of this stage is the sudden light of illumination (illumination) that makes people aware of the discovery of answers. e. Evaluation stage; At this stage, the ideas generated are carefully examined and critically separate ideas that are less useful, inappropriate or too costly to implement.

Figure 8 Rawlinson Framework

Alex Osborn's Theory

Another model is the "creative problem solving (CPS)" model, a method for solving problems or identifying opportunities when conventional thinking fails. CPS involves decomposing a problem, generating ideas, and evaluating those ideas to find the most effective solution. CPS can help people think outside the box, challenge assumptions, and see situations from multiple perspectives. It was presented by Alex Osborn (1963). The model consists of 6 steps, namely (1) Objective Finding, (2) Fact-Finding, (3) Problem Finding, (4) Idea Finding, (5) Solution Finding (Idea Evaluation), and (6) Acceptance-Finding/Idea Implementation. (Stephenson, 2023).

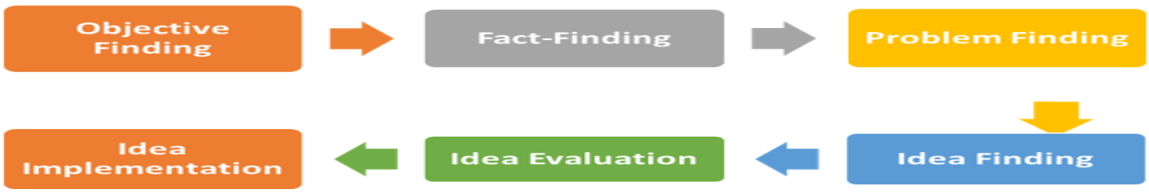

Figure 9 Alex Osborn Framework

Conclusions

This systematic literature review analyzed research trends, methodologies, key elements, and frameworks related to creative thinking skills in primary schools, based on an analysis of 50 relevant articles published from 2013 to 2024. Findings from this review offer significant insights for educators and researchers seeking effective strategies to enhance creative thinking within primary education contexts. Journals that prominently publish on creative thinking include Thinking Skills and Creativity,

British Journal of Education Technology, Education 3-13, Education Technology Research and Development, and CEUR Workshop Proceedings. The application of creative thinking in primary education predominantly occurred within social sciences (53.9%), followed by computer science (10.8%), psychology (7.8%), arts and humanities (5.9%), engineering (3.9%), and other disciplines in smaller proportions.

The findings hold significant relevance as they highlight current academic interest, methodological approaches, and theoretical frameworks, thereby expanding our understanding of effective practices for fostering creativity in educational settings. However, the practical implications of these findings remain underexplored in terms of their direct applicability in primary school contexts. Educators can leverage these insights by explicitly integrating established frameworks such as Wallas', Rawlinson's, and Osborn's models into the curriculum, thus providing structured guidance for cultivating creativity in students.

This review acknowledges several limitations. The potential omission of relevant studies, despite systematic efforts, might limit the comprehensiveness of the results. Additionally, subjective biases inherent in evaluating study quality could influence the conclusions drawn. Furthermore, time constraints may have restricted the depth of analysis and synthesis.

Therefore, future research should specifically address these limitations and further examine practical applications of creative thinking frameworks within classroom environments. Concrete recommendations include conducting comparative empirical studies to evaluate the effectiveness of different creativity frameworks in Indonesian primary schools. Future studies should also adopt longitudinal approaches to explore the sustained impact of creativity interventions. Expanding research across varied demographic and geographical contexts–particularly between rural and urban schools–can yield deeper insights into socio-cultural factors influencing creativity development. Finally, further investigation into integrating technology-based tools such as robotics or augmented reality within creative teaching practices can enhance students' engagement and creative capabilities. These targeted explorations will provide valuable contributions, bridging the existing research-practice gap and fostering meaningful improvements in creative thinking education.

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